The Acoustic Research Detachment — a History

The Acoustic Research Detachment (ARD) employs nearly 100 civilian and contractor scientists, engineers, technicians and support personnel and has a business volume of $15M per year.

ARD was founded by what was then known as the David Taylor Model Basin, now the Carderock Division of the Naval Surface Warfare Center, in 1946 on the grounds of the former Farragut Naval Training Center, adjacent to Lake Pend Oreille. For the first two decades of its existence, the small workforce and modest facilities were involved primarily in small-scale acoustic testing using the near-perfect acoustic environment of Lake Pend Oreille. In the mid-1960s, ARD acquired its first submarine model, KAMLOOPS, a quarter-scale STURGEON Class model submarine used for bow-area flow noise testing. This marked the beginning of what has become the primary work of ARD, testing of submarine stealth technologies using large-scale models.

In the mid-1980s, ARD experienced a significant expansion in facilities and personnel with the beginning of the Large Scale Vehicle (LSV) Program. KOKANEE (LSV 1) is a battery-powered autonomous quarter-scale submarine model used primarily for SEAWOLF propulsor evaluation leading to the unprecedented levels of stealth of the SEAWOLF Class. KOKANEE has also been used for propulsor and hull form evaluations for the VIRGINIA Class attack submarine.

ARD experienced another expansion in the mid-1990s with the installation of the Intermediate Scale Measurement System (ISMS). ISMS is a very high-precision tool for the study of structural acoustics relating to active target strength and machinery radiated noise. Results from ISMS are enhancing the VIRGINIA Class technology insertion process and are expected to have a dramatic effect on stealth and performance. In 2001, ARD will enter the final stages of an aggressive building program to replace a collection of WWII-vintage shops and converted government housing with one state-of-the-art R&D facility.

ARD operates under the cognizance of the Carderock Division's Signatures Directorate, with the mission of ensuring that the Navy maintains a powerful advantage in a dangerous world.

The Carderock Division, Naval Surface Warfare Center

www.dt.navy.mil

The Carderock Division, a field activity of the Naval Sea Systems Command (NAVSEA), is the largest, most comprehensive establishment of its kind in the world. The Division provides research, development, test and evaluation, fleet support and in-service engineering for surface and undersea vehicle hull, mechanical and electrical systems and propulsors, and logistics research and development to the Navy, the Department of Defense and other non-government sponsors. Serving as the Navy's and the nation's Maritime Technology Center, the Division is chartered by law to support the Maritime Administration and the maritime industry.

The Carderock Division, with its unique laboratories and test facilities, large-scale land-based engineering and test sites, and at-sea measurement facilities has been at the forefront of technologies vital to the success of the Navy and maritime industry for over a century. The key element in its technological success is the breadth and depth of its capabilities. The Division supports its customers over an impressive stretch of scientific areas related to surface and undersea vehicles. Today, the Division's maritime expertise ensures that the Navy maintains tactical superiority in the most cost-effective manner.

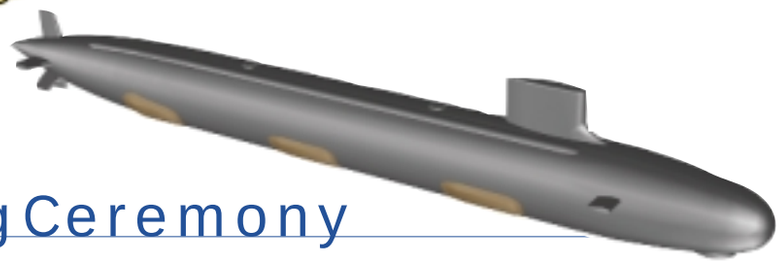
The Division employs 3,800 civilians and 30 military personnel with most located at two major sites: the Headquarters in Bethesda, Maryland (approximately 1,750 people) and the Ship Systems Engineering Station in Philadelphia, Pennsylvania (about 1,650 people).

We Gratefully Acknowledge our Partners in Bayview:

Athol Elementary School • Timberlake Junior/Senior High School Pep Band

Coeur d'Alene Veterans of Foreign Wars Post 889

ARD on Lake Pend Oreille



Christening Ceremony

of the Large Scale Submarine Test Vehicle

CUTTHROAT (LSV 2)

Acoustic Research Detachment, Bayview, Idaho

November 15, 2000

The Cutthroat Large Scale Submarine Test Vehicle (LSV 2)

Cutthroat (LSV 2) is a 205-ton unmanned autonomous submarine test vehicle. A scale model of the Virginia Class submarine, Cutthroat is 111 feet long with a maximum diameter of 10 feet. Like its predecessor, Kokanee (LSV 1), Cutthroat will operate in the deep waters of Lake Pend Oreille in northern Idaho at the Acoustic Research Detachment (ARD). Cutthroat will be used to affordably explore and test emerging technologies and to conduct physics-based experiments. Specific emphasis will be on stealth, hydrodynamics, hydroacoustics and propulsor designs, to permit technology insertion into current and future submarines.

Newport News Shipbuilding, the prime contractor, teamed with Electric Boat Corporation to build and design Cutthroat for the Naval Sea Systems Command. The same team is building the first submarine of the Virginia Class, with Electric Boat serving as the prime contractor. Other Cutthroat team members include GNB Technologies (propulsion batteries), Naval Surface Warfare Center (Onboard Data Acquisition System), Lockheed Martin (Guidance, Navigation, and Control System), Vehicle Control Technologies (Guidance, Navigation, and Control System), Allied Signal (Electro-Mechanical Hydraulic Actuators), and Eaton (Electric Drive Control System).

Above: The bow (front) half of Cutthroat (LSV 2), built by Newport News Shipbuilding in Virginia, arrived in Bayview on July 31, 2000.
Right: The stern (rear) half of LSV 2 was built by Electric Boat in Connecticut and delivered to ARD on September 1, 2000.

Cutthroat represents a significant improvement in reconfigurability, quieting, and maneuvering. The modular design of Cutthroat provides planned separation points in the vehicle structure to facilitate reconfiguration of the vehicle. The acoustic stealth characteristics of Cutthroat are invaluable to technology development.

Cutthroat provides the Navy a unique capability to conduct large-scale hydrodynamic experiments, including highly instrumented maneuvering and recoverability testing. Appendages such as the sail, dihedrals, and control surfaces are instrumented with dynamometers supporting critical data acquisition.

A unique partnering agreement with industry provides a contractor developed and owned permanent magnet motor for electric drive main propulsion. At delivery, Cutthroat will have a 3,000 shaft horsepower (shp) plant coupled with a state-of-the-art electronic motor controller, expandable to 6,000 shp with additional motor controller modules. Other advanced technologies on Cutthroat include electro-mechanical hydraulic actuators in the steering and diving system, positive flood port closures, and several other acoustic quieting measures.

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NAVSEA
CARDEROCK
Surface Warfare Center Division

GENERAL DYNAMICS
Electric Boat

ATHOL ELEMENTARY SCHOOL — THE CUTTHROAT KIDS

In 1997, the students of Athol Elementary were asked by the U.S. Navy to name the Navy's future Large Scale Vehicle. This vehicle, they were told, will be the largest autonomous submarine in the world and will be delivered to ARD Bayview, Idaho in approximately three years for use as a demonstrator vehicle for the advanced technologies anticipated for future submarines. The tests performed on this vehicle will help ensure that the Navy's submarine force remains the quietest in the world, now and in the future.

The students and teachers were provided with the names of several fish, native to Lake Pend Oreille and Idaho, from which the selection would be made. They cast their votes, and in the Spring of 1997 the students of Athol Elementary School proudly named this test vehicle, "CUTTHROAT." An excellent choice for this area, the Westslope Cutthroat, originally found in most streams north of Idaho's Salmon River, is easily identified by the red slash marks under the mouth. The students and teachers have been a part of this project every step of the way. Many of the students here today attended the keel-laying ceremony held in October 1997 and presented the Navy with hand-made class projects depicting their heartfelt pride and enthusiasm for the CUTTHROAT.

The Navy and its industry partners have continued to keep the students informed of the status of the LSV 2 as it was being built. Rear Admiral Phil Davis visited the school and emphasized the importance of their involvement, stating "You're what we call the sponsors of the submarine. You get to be a piece of its history throughout its life." In 1999, two students won an essay contest, and the prize was a trip to the East Coast to view, firsthand, the CUTTHROAT under construction at Newport News Shipbuilding and Electric Boat.

The ceremony today brings to fruition the school's unique involvement with this project. The students will sign their names on the hull and their Principal, Connie McGee, will have the honor of christening CUTTHROAT (LSV 2).

The Navy in Bayview and the students and teachers of Athol Elementary School have enjoyed a long and cooperative relationship. Becoming the sponsor of the Navy's newest Large Scale Submarine Test Vehicle not only strengthens the bond between this community and the Navy, it also serves to enhance the students' knowledge of America's submarine force and its importance to our country's defense.

October 29, 1997:

Athol Elementary School students enthusiastically attended the Navy's **Keel-laying Ceremony** for the CUTTHROAT (LSV-2). Jade McDaniel, Crystal Serroni, and Nathan Anderson presented a papier-mache model of the new submarine test vehicle made by their fifth grade class to RADM Edmund P. Giambastiani, Jr., USN and RADM John P. "Phil" Davis, USN.